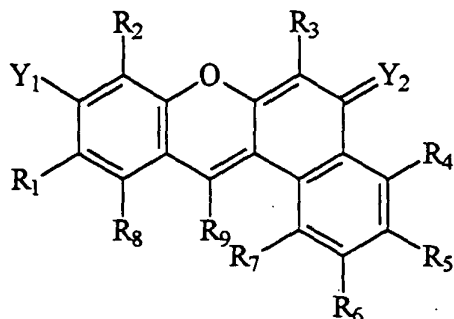
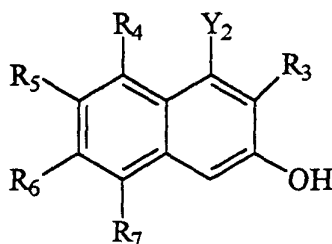


ABSTRACT

A class of asymmetric monobenzoxanthene compounds useful as fluorescent dyes are disclosed having the structure



- 5 wherein Y_1 and Y_2 are individually hydroxyl, amino, imminium, or oxygen, R_1 - R_8 are hydrogen, fluorine, chlorine, alkyl, alkene, alkyne, sulfonate, amino, amido, nitrile, alkoxy, linking group, and combinations thereof, and R_9 is acetylene, alkane, alkene, cyano, substituted phenyl, and combinations thereof. The invention further includes novel intermediate compounds useful for the synthesis of asymmetric benzoxanthene compounds having the
- 10 general structure



- where substituents R_3 - R_7 correspond to like-referenced substituents in the structure of described above, and Y_2 is hydroxyl or amine. In another aspect, the invention includes methods for synthesizing the above dye compounds and intermediates. In yet another aspect,
- 15 the present invention includes reagents labeled with the asymmetric benzoxanthene dye compounds, including deoxynucleotides, dideoxynucleotides, phosphoramidites, and polynucleotides. In an additional aspect, the invention includes methods utilizing such dye compounds and reagents including dideoxy polynucleotide sequencing and fragment analysis methods.